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7 February 1955

MEMORANDUM FOR: Assistant Director for
Research and Reports

SUBJECT : Soviet Adaptations of US-
Model Machines

REFERENCE :

1. As discussed is requested that your office undertake an analysis of 122 photographs of Soviet machines and equipment in order to select those models which are identical, or almost identical, with machines of US manufacture.

2. We would like you to establish as nearly as possible the make and model of the US equivalent of those Soviet models for which there are equivalents. Please also indicate the probability of direct copying by the Soviets from the American originals in each case, and any obvious efforts to disguise such imitation.

3. Should you have any further questions regarding this request, please refer them

CIA HISTORICAL REVIEW PROGRAM
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1999

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C O :

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for Proj.*

Office Memorandum • UNITED STATES GOVERNMENT

TO : Chief,

DATE: 14 Mar 1955

FROM :

SUBJECT: Soviet Agricultural Machinery Photos

The attached photos have been examined in a cursory fashion. In general, the machines shown in these photos are types not produced in the United States or types produced in the United States but in smaller sizes.

The following specific comments are tendered:

1. Grain combines: The self-propelled grain combine (CIA 18319) has been reported from other US sources as being a copy of a US grain combine of the 1930's. The tractor-drawn grain combines are larger and of a more complicated design than those produced in the US but may have been designed originally from US models...back in the 1930's when the USSR began producing grain combines.
2. Potato harvesting combine: The US does not produce a machine of this type, designed for harvesting potatoes on areas of hundreds or thousands of acres.
3. Self-propelled mowing machine: A machine of this general type was produced in the US over 30 years ago but was dropped because it was considered too unwieldy and uneconomical.
4. Cotton picker: The US and the USSR have been working to obtain a suitable cotton picker for many years. The US has achieved its goal, but the USSR has not. The USSR has a few old US cotton pickers on hand but has not been able to obtain one since the US perfected its machines. Undoubtedly, the Soviet picker incorporates some of the features of the earlier US machines.
5. Other machines: Hemp is a minor crop in the US. A hemp harvester such as is pictured in the attached photo has never been attempted in the US. The grain drills are designed for larger areas of land than normally is found in US farms and, consequently, are larger and heavier than US drills. The harrows and other machines are about the same as harrows, disc harrows, etc. in the US. The plow shown is perhaps larger and more rugged in appearance than US plows.

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Chief,

7 March, 1955

Chief,

Contributions to Project

1. Attached are the Branch comments on the photographs from

2. When no comment is made on a photograph, it may be assumed that the Branches either are not responsible for the commodity represented or do not have adequate information to make an accurate evaluation.

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7 March, 1955

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Enclosure

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1. The Photographs of electronic equipment are evaluated as follows:

- a. Signal generators are made in many different sizes and shapes by various firms; so it is difficult to say whether or not this is a copy. It does not look like a copy of a US type because of the connector (lower-right-hand corner) and the pilot light (right-hand side). It appears to have two sets of handles, which is unusual (long vertical handles at each side and handles at ends).
- b. This appears to be a copy of the DuMont 208 5-inch oscilloscope which was a common type in the World War II period.
- c. "Higa" radio receiver with 21 tubes and automatic record changer is a complete new Soviet design using known principles.
- d. Radios appear to be sets of original Russian design. The cabinets are not unique but appear to be similar to German present sets. Speakers appear to be electro-dynamic... not preferred by present practice in high quality sets.
- e. Soviet adaptation of US practice (Admiral and Motorola) using miniature tubes and American circuit. Soviet designed set.
- f. Soviet adaptation of German People's TV receiver of 1939 design. No a Chinese copy, but includes Soviet innovations.
- g. Soviet design based on German and American technology. Basic principle copied, but set is Soviet.
- h. Soviet design based on German and American technology. Basic principle copied, but set is Soviet.
- i. Set has typical western look but is original Soviet design. Better features of Hungarian and East German designs probably used as standards.
- j. Set appears to be similar to East and West German tape recorders, but may be original design.
- k. Automatic telephone station is not exactly a duplicate of US equipment but appears typical. Rack mounting and cable entrance similar to this can be found in US installations. Equipment on racks does not appear to duplicate US equipment.
- l. Harvard Radio set not a copy of US equipment.
- m. Cathode TV Transmitter probably RCA equipment or a copy.
- n. Not believed to be a copy of US equipment.
- o. Ignitron sets look very similar to US equipment, but detail is not clear enough to judge if copied or original US.
- p. Electron microscope is somewhat similar to Western types but probably not a "Chinese" copy of any western type. The console (with dials) is a different shape and the top enclosure for the electron gun is a different shape from those of RCA or Siemens and Halske AG.
- q. Look like copies of Westinghouse ignitrons.

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2. Photo CIA - Soviet Source. This is a photograph of the Soviet helicopter known in the West as the Hound (Type 36). The Soviet designation is the MI-4. This aircraft resembles the U.S. helicopter HH-3B-1 made by Sikorsky for the Navy. This photo indicates that Soviet designers no doubt were strongly influenced by this U.S. design, however, there is no evidence of direct copying.

3. Photo CIA - Source on RD-45. This is a photograph of a jet training model probably for the Soviet engine models RD-45, RD-500 and VK-1. The RD-45 jet engine was a direct copy of the British Nene, and the RD-500 and VK-1 are later engine designs which have improvements over the basic design (British Nene). Pratt and Whitney purchased design rights on the British Nene from which they developed the J42 series of jet engines (J42-P-4 and P-6). Therefore, the USSR RD-45 resembles the U.S. J42 to a considerable degree.

4. An examination of the photographs listed below reveals no instance of Soviet adaptation of a U.S. model. The optical equipment, surgical equipment and seismograph appear to be of German design. (CIA Nos.

5. The machine tools and metal-forming equipment (CIA Nos.) are not U.S. adaptations. In one case (C) there is no equivalent U.S. machine being produced.

6. The miscellaneous equipment (CIA Nos.) has not been studied by the Branch in sufficient detail to make a firm judgement. However, a preliminary guess by the analyst is that the equipment does not resemble U.S. items.

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Machines Which Are Patterned After U.S. Prototypes
in Part or Totally

1. GAZ M-20 Pobeda passenger automobile (photo).

a. Body hardware is patterned after Chevrolet.

b. Suspension, front seat adjustment and dash are almost identical with Chevrolet, but are actually patterned after the German Opel Kapitän, which was and is built by General Motors subsidiary in Germany and which has access to GM designs.

c. Design of frameless body structure is a copy of Opel Kapitän and differs from any U.S. model.

d. Engine is four cylinder GAZ-M20 which has parts in common with six cylinder GAZ-51 engine. These engines are orthodox designs developed for Soviet conditions from standard U.S. engineering practice. They are not exactly like any particular U.S. engine but copy many parts and components. The basic design is said by D. E. Shinkin* to be copied from the U.S. Continental engine, but it has undergone a number of mutations.

e. Transmission and rear axle are not Opel designs, but are probably descended from the Ford Model A.

2. Moskvich passenger automobile (photos foreground).

This vehicle resembles no U.S. passenger car and is copied from the Adam Opel A.G.'s "Kadet".

* D.E. Shinkin, Ph.D., The Motor Vehicle Industry of the USSR, 1947.

3. ZIS-110 passenger car (photo 1).

This vehicle is a copy with only very slight modifications of the 1942 Packard '180', chassis Model 2008. It is produced predominantly as a closed limousine, but a few units have been equipped as open limousines and ambulances.

4. GAZ-67B, a jeep (photo 2).

a. This vehicle was inspired by the U.S. jeeps sent to the USSR on Lend-Lease.

b. It is not a carbon copy of the U.S. jeep. It has mostly Ford Model A chassis parts (including the engine) which were standard for the GAZ-1 passenger car and the GAZ-AA and 31 trucks.

c. The GAZ-67B is no longer in production, having been replaced by the GAZ-69, a heavier type of passenger-cargo vehicle.

5. GAZ-69, a 3/4 ton, 4x4, cargo and passenger vehicle (photo 3).
(There is another body style.)

a. This vehicle was inspired by the U.S. military Dodge (weapons carrier and command-reconnaissance body styles), 3/4 ton, 4x4 trucks.

b. It has the M-39 engine (identical to the Pobeda engine) and other interchangeable GAZ chassis parts. It has no direct copies of Dodge parts except for the general appearance of the sheet metal.

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c. It has recently been placed in production and will replace the GAZ-67B for military and agricultural use. The greatest part of the output of this vehicle is probably received by agriculture.

6. Amphibious automobiles (photo)

a. These are U.S. Army amphibious trucks, 1/2 ton, sent to the Russians under lend-lease. They are not Soviet vehicles.

7. ZIS-154 bus (photo)

a. This is a direct reproduction of the GMC-TB 3600 type bus with the Soviet copy of the GMC Series 71 diesel engine which Russians designate as YaAZ-204.

b. The Russians have not copied the hydraulic torque converter used in the GMC bus and have substituted an electric drive in place of it.

c. The bus is now out of production because in Russian practice the diesel creates a smoke nuisance in the large cities. Only the ZIS-155, a smaller gasoline engine powered bus is now made by ZIS. Experiments with converting the YaAZ-204 engine to burn compressed gas were made in an effort to adapt the bus to city conditions, but the gas version has not been placed in production.

8. ZIS-585 dump truck (photos)

a. The cab and hood sheet metal has been inspired by the International Harvester trucks received on lend-lease.

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b. The engine is quite similar to the Hercules JI models but with belt driven water pump and generator instead of gear driven as in the Hercules. However, it has evolved from an earlier Hercules engine (V10) which was adopted for the earlier H12-G truck.

c. Clutch, transmission, axles and steering gear are orthodox U.S. types.

d. Air brake equipment including compressor is copied from Bendix-Westinghouse equipment.

9. YALZ-200 Chassis (with chassis K-21 driven by power take off from truck transmission) (photo)

a. No information on crane is available but the truck is patterned after U.S. designs.

b. Engine is YALZ-200, a direct copy of the GMC 4-71 diesel engine.

c. Suspension is Mack type with spring ends mounted in rubber blocks.

d. Clutch is a type used in Mack vehicles and rear axle is a conventional double reduction type used in very heavy U.S. trucks.

10. Motorcycle M-72 (photo)

a. Copy of German BMW-150.

11. Motorcycle "Koskrich" (photo foreground).

a. Appears to be a copy of the East German IFA RT-125 motorcycle made at Chemnitz.

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12. GAZ-51 truck (photo 1.)

a. This truck has cab sheet metal inspired by the Studebaker trucks received by Russia on lend-lease.

b. D.E. Shishin says the chassis and engine were copied from the U.S. Brooklyn Model 78 which had a ^Ccontinental engine. At any rate all components are of orthodox U.S. design.

13. HAZ-575, a 25-ton off-highway dump truck (photo .)

a. The chassis parts arrangement (shape of frame rails, rubber bushed dump body hinge pins, shape and position of fuel tank, planetary final reduction in rear axle hubs, shape of dump body) are quite similar to the 22-ton Model T (U.S.) Euclid and are probably copied therefrom.

b. The engine is a V2-300 modified Soviet tank diesel of 300 hp and the transmission and clutch assembly incorporates a hydraulic coupling which was not standard on the Model T Euclid.

14. S-80 tractor (photos 2.)

a. This is an exact copy of the Caterpillar Tractor Company's Model D-7 except that all parts are made to the nearest metric unit and not quite interchangeable with the D-7.

15. DT-54 tractor (photo 3.)

This tractor is a diesel modification of the earlier kerosene Model 55h ATZ-BATI.

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16. SSh ATZ-NATI Tractor (photo

a. This tractor is different from any other type of tractor, but is patterned after German, British and American types. It is no longer made.

17. S-65 tractor (photo

a. Direct copy of early Caterpillar D-7 tractor. No longer in production. Replaced by the S-80.

18. MTZ-2 tractor (photos

a. Style and design typical of several U.S. types. Uses the D-36 diesel engine which is also in the KB-25 and KB-35 tractors. Not copied from any single model.

19. KB-35 tractor (photo

a. High clearance modification of KB-35 tractor. It is designed for cultivating beet crops. The KB-35 bears a strong resemblance to the Caterpillar D-4 but differs in several respects, including the engine.

20. U-4 tractor (photo

a. A special variant of the U-2, this tractor is designed to carry cotton picking equipment. The U-2 is copied from the International Harvester's early Farmall model. U-1, U-2, U-3, and U-4 tractors are still in production at the Vladimir Tractor Plant but even the Soviets consider them to be obsolescent.

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21. KhsTZ tractor (photo

a. Obsolescent and out of production.

b. Copy of an early (1920s) International Harvester (McKormack Deering) model.

22. GII - D-1141 Antograder.

This has the same general lines as the Allis-Chalmers AD-4. However, the scarifier comes as special equipment on the AD-4 whereas it appears to be standard equipment on the D-1141.

23. GII - 3-wheel roller.

Probably a copy of an old Model Galion known as the Galion 3-wheel roller.

24. GII

Mechanical coal loader - obsolescent.

25. Diesel-Electric Locomotive, model TE-1. (GII photograph)

During World War II, the United States furnished two types of diesel electric locomotives to the USSR in connection with lend-lease: type D^A (manufactured by American Locomotive Co.) and type D^B (manufactured by Baldwin Locomotive Works. Using the American locomotives as prototypes, the locomotive plant at Kharkov developed the TE-1 and began series production in 1946.

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26. Diesel-Electric Locomotive, model TE-2. (CIA photograph).

Model TE-2 is a modification of model TE-1 produced at the Kharkov locomotive plant starting in 1948. It uses the ^{diesel} engine, has a similar electric drive system and a modified axle arrangement.

27. The diesel locomotive shown in photograph 7-95 (CIA photograph) is the first unit of a Hungarian diesel train-set, a number of which have been exported to the USSR since the war. It is not modeled on a US prototype.

28. Steam locomotive, model SU (CIA photograph).

Model SU has been built in the USSR since 1925 and is a modification of the pre-revolutionary Russian locomotive, model S.

29. Electric Locomotive, models VL-19 (CIA photograph), and VL-22 (CIA photograph).

Model VL-22 freight-passenger locomotive is a modification of model VL-19 freight-passenger locomotive. VL-19 is based on Model SS freight locomotive. The first two models of the SS series were built in the United States prior to 1932; both the SS and the VL-19 were first assembled in the USSR in 1932.

30. Four-axle, 60-ton, freight car (photo 7-109, CIA).

Freight cars of this general type have been built in the USSR since the middle 1920 's. It is not known whether US prototypes were used as their basis. During World War II, however, 50-ton, 4-axle freight cars manufactured by the Pullman-Standard Car Manufacturing Company were shipped to Russia on lend-lease. The close similarity of post-war Soviet-built flat-cars to this US flatcar suggests that the latter was used as a prototype.

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31. Tank cars (photo CIA 1 and 1, CIA .

Not modeled on a US prototype so far as is known.

32. Track laying machine, car mounted (photo 1 1, CIA).

Not modeled on US prototype.

33. Dining Car (photo 7-112, CIA).

This interior view suggests that the car was modeled on an European rather than American prototype.